Second Report on Recent Progress in the Theory of Groups of Finite Order: Professor G. A. Miller, Stanford University.

In the absence of Professor Miller this report was presented in abstract by Dr. W. B. Fite, of Cornell University. It will be published in the *Bulletin of the American Mathematical Society.*

Displacements Polygons: Professor J. Burkitt Webb, Stevens Institute of Technology.

Owing to the absence of Professor Webb at the time this paper was called for it was read by title.

Some Theorems on Ordinary Continued Fractions: Professor Thomas E. McKinney, Marietta College.

Let D be any positive integer not a perfect square, and let its square root be represented by an ordinary continued fraction. This paper determines the form of D so that the continued fraction representing its square root may have a period with one, two, three or four elements, and applies the results to the determination of the number of reduced forms in the class to which the indefinite quadratic form (1, 0, D) belongs.

On the Forms of Sextic Scrolls of Genus One: Dr. Virgil Snyder, Cornell University.

In his classification of sextic scrolls of genus 1, Dr. Snyder employed the method of point correspondence between two plane sections and made use of the following theorems which were proved in one of his former papers: (1) The nodal curve (simple or composite) is of order 9; (2) every generator cuts four others, and (3) any non-reducible plane curve lying on the surface is of genus 1.

Thirty-three types are found, ten of which have a multiple conic. It will be published in the *American Journal of Mathematics.*

Transformation of the Hypergeometric Series: Professor Edgar Frisby, U. S. Naval Observatory.

If in the differential equation of the second order connecting the elements of the hypergeometric series

$$P=1+\frac{\alpha\beta}{\gamma}x+\frac{\alpha\beta(\alpha+1)(\beta+1)}{1\cdot 2\cdot\gamma\cdot(\gamma+1)}x^2+\text{etc.}$$

$x^\mu P'$ be substituted for P, new relations are obtained in which P' takes the place of P, and the new elements are functions of the original elements. μ is determined from the condition that the new series must be of the same general form as the old. If, in addition, x be replaced by $1/x$ another series is obtained. From these two new series, by proper substitution of the new derived elements, are obtained almost by inspection, the twenty different series ordinarily given in works on differential equations.

Edwin S. Crawley,
Secretary.

SECTION G, BOTANY.

Section G of the American Association met in the Botanical Hall of Phipps Conservatory on the mornings of June 30 and July 3, 1902. In the absence of Professor D. H. Campbell, Stanford University, Professor C. E. Bessey, of the University of Nebraska, was elected acting Vice-President.

The abstracts of papers presented are as follows:

The Prevalence of Alternaria in Nebraska and Colorado During the Drought of 1901: George Grant Hedgcock, Lincoln, Nebr.

This paper gives a brief synopsis of observations made in various sections of Nebraska and Colorado during the severe period of drought in July and August of

the year 1901. The conditions which existed retarded the development of such fungi as *Cercospora* and *Phyllosticta,* but favored the growth of *Alternaria* upon the blighted leaves of a number of plants, especially those of the sugar beet, potato, pumpkin, cantaloupe and plantain.

Effect of Acetylene Gas-light on Plant Growth, Plant Environment and Plant Diseases: FRANK WILLIAM RANE, New Hampshire College, Durham, N. H.

The effect of acetylene gas-light has a marked effect upon plant growth, especially under glass, during the winter months. Experiments show more effect upon certain plants than others. Illustrated by photographs of plants.

Plant Environment and Plant Diseases: F. W. RANE.

Healthy plants seem to evince the law of self preservation to more or less an extent. Just how far certain well-known plant diseases are brought about through a misunderstanding of ideal environment is thought to be a problem with possible gradual solution. Plant depredations it is believed are not naturally associated with plants where the environment or culture is most favorable. Plant diseases and plant culture are closely associated. Examples are offered.

Soil Temperatures and Vegetation: D. T. MACDOUGAL, N. Y. Botanical Garden.

A description of a method of making observations on soil temperatures by means of the newly designed Hallock thermograph. The influence of the divergent temperatures of the soil and air is touched upon.

Conditions Influencing the Vitality and Germination of Seeds: J. W. T. DUVEL.

The above article treats of the vitality of seeds as affected by various climatic conditions, especially the deleterious influences of warm, moist climates such as we have in the Gulf States. The condition and methods for keeping seeds in such unfavorable climates are discussed at some length, showing that the first requisite for prolonged vitality of seeds is a reduction in the amount of hygroscopic moisture present, thereby diminishing the respiratory activity and consequently a prolongation of the life of the seeds.

Some Neglected Factors in Discussions of Heredity: GEORGE J. PEIRCE.

Certain influences to which organisms are exposed are constant in operation and intensity; there is no escape from these influences; they have never been eliminated in experiments, and their importance can only be guessed. Among these influences are the atmosphere, the earth as a whole, water, gravity, which have been uniform in physical and chemical properties for millions of generations, if not always. The reaction of the living organism to these influences should be considered in all discussions of heredity.

Sclerotinia Fructigena: J. B. S. NORTON, College Park, Md.

Studied by Woronin, Smith, and many others; conidial stage (monilia) destructive fruit disease; apothecia not previously discovered. Found abundant on buried peach and plum fruits two years old in many Maryland orchards; the disk appears just above ground. Description of apothecia, asci, spores, etc. Connected with monilia by many laboratory cultures on flowers, fruit, and various culture media. Cycle of development completed in a few days. Spores germinate in ten hours. Economic importance; fruits should be burned or otherwise destroyed.

A Bacterial Soft Rot of Certain Cruciferous Plants and Amorphophallus Sinense; A Preliminary Report: By H. A. HARDING and F. C. STEWART, N. Y. Agric. Exp. Sta., Geneva, N. Y.

The Finding of Puccinia phragmitis (Schum.) Korn. in Nebraska: John M. Bates, Callaway, Nebraska.

June 14, 1901, the writer found the æcidal stage on garden rhubarb, in Kearney; August 23 the next two stages were found on *Phragmitis* at Callaway, sixty-five miles northwest. This year he has found the æcidal stage on *Rumex Britannica, R. altissimus* and *R. crispus,* and on rhubarb in four gardens, thus completing the life history. It is thought to be new to this continent.

Notes on Diseases of Western Coniferæ: Hermann von Schrenk, Mo. Botanical Garden, St. Louis, Mo.

The coniferous trees of California, Oregon, Washington, Idaho and adjoining States are attacked by a number of fungus diseases, some of which destroy as high as forty per cent. of the standing timber. The most important diseases are caused by forms of *Trametes pini, Polyporus Schweinitzii, Polyporus Libocedris,* n. sp., *Echinodontium tinctorum, Polyporus officinalis.* The development of these fungi and the manner and extent to which they destroy the wood were described. Reference was made to the blue disease of Black Hills timber.

A Disease of Potato Stems in Ohio, Due to Rhizoctonia: Augustine D. Selby, Wooster, O.

The work of Duggar and Stewart in New York upon diseases caused by the sterile fungus *Rhizoctonia* and the recent preliminary publication by Rolfs upon potato failures in Colorado due to the same source, is already known to workers in plant pathology.

For more than a year past work has been in progress at the Ohio Experiment Station upon the *Rhizoctonia* on potatoes. During the present June outbreaks of a well-marked stem disease in Ohio, due to this source have occurred at several points in Ohio. Local areas of decay are situated both above and below the soil line; the most striking feature, however, is the characteristic rosette aspects of the central leaves of the plants attacked. By slight incurling of the leaves the affected plants may be readily discerned in walking through the field; apparently this characteristic is constant on a number of varieties. Ten per cent. or more of the plants have been found affected; doubtless larger percentages may occur.

Arachniotus trachyspermus, A new Species of the Gymnoascaceæ: C. L. Shear, Department of Agriculture, Washington, D. C.

Arachniotus is a genus of primitive ascomycete, described by Schroeter in 1893. Four species have thus far been described. The present species, which appears to be new, is the first thus far reported in this country so far as known to the author. It was isolated from diseased cranberries grown in New Jersey and grown in abundance in culture media. The fungus first forms a thin layer of fine snow-white hyphæ. Mature peridia are produced in from two to three weeks. These are globular, about ½ mm. in diameter, consisting of a thin, loose layer of fine hyphæ which enclose a dense mass of spherical or subglobose asci borne at the apices of the much branched and interwoven fertile hyphæ. Asci are eight-spored. Spores almost colorless but in mass showing a faint greenish-yellow tint, rough, elliptical, $3.5 \times 2.5\mu$.

An Instance of a Change in the Native Flora: Chas. E. Bessey, Lincoln, Nebr.

In Nebraska the little grass *Festuca octoflora,* has been common throughout the State ever since botanizing has been done, but it has never been a conspicuous plant. This year inquiries have been sent in to the University and Experiment Station from

nearly all parts of the State, accompanied by the remark that the grass had appeared for the first time. There is no question as to the much greater abundance of this grass the present year. It is of considerably larger size, also, than usual. The suggestion is made that the intense heat and drought of last year had to do with the greater abundance of this species of the present year.

In connection with this case attention is called to the fact that twenty-five years ago after the 'grasshopper raids' the farmers noticed the great abundance of *Sporobolus vaginæflorus,* which they called the 'grasshopper grass,' and supposed that it had been brought by the grasshoppers.

Note on the Fuel Value of Cottonwood: CHAS. E. BESSEY, Lincoln, Nebr.

On the plains where the cottonwood (*Populus deltoidea*) is very commonly planted, there is much prejudice against it as a tree having any other value than for shade and windbreak. It is regarded as having low fuel value. Some careful measurements and calculations made by the writer show that on account of its rapid growth it produces more heat-yielding fuel in a given time than the trees with which it is usually planted. On a given area in a given time more heat units may be produced than by the use of any other of the commonly planted trees.

Features of the Flora of Cuba: CHAS. LOUIS POLLARD, 1854 Fifth Street, Washington, D. C. (Illustrated with lantern.)

A general account of the Cuban flora with special reference to the ecological aspects. The various plant zones and plant formations of the island are described, and the characteristic flora of each discussed. The plants of economic or ornamental value are also briefly discussed.

The Origin of the Achromatic Figure in Pellia: CHARLES J. CHAMBERLAIN, Department of Botany, University of Chicago.

This investigation deals chiefly with the first two nuclear divisions in the germinating spore. For comparison, however, mitosis was studied in other phases of the life history. The principal conclusions are as follows: The stimulus to nuclear division comes from within the nucleus. The asters are cytoplasmic in origin. The caps come from the outer portion of the nuclear membrane or from a *Hautschicht* surrounding the nucleus. The appearance and disappearance of astral rays suggest that they are concerned in the movement of nuclear matter. The centrosphere is formed by the astral rays, not the astral rays by the centrosphere. This centrosphere represents a condition intermediate between the well-defined centrosphere of one of the thallophytes, and the centrosomeless condition of the higher plants. The spindle fibers, except the mantle fibers, grow from one pole to the other. In early stages two half spindles are often distinguishable.

Comparison of the Development of the Embryo Sac and Embryo of Claytonia Virginica and *Agrostemma Githago:* MEL T. COOK, Greencastle, Indiana.

Claytonia Virginica has one archesporium; it forms one, occasionally two, tapetal cells, four megaspore cells, of which the lower develops into the sac in the usual manner. Very little enlargement of the sac is evident until the four-celled stage is reached, but after that time it enlarges rapidly and bends to form almost a complete circle. The antipodals disappear early; the synergids persist until the embryo is quite large. In the formation of the embryo the cell division is very irregular; the basal cell of the suspensor is small;

only one cotyledon develops. The endosperm is peripheral.

In *Agrostemma Githago* we find from one to three archesporial cells, one or two tapetal cells and only two megaspore cells, of which the lower develops into the sac. Frequently two sacs begin to develop, but one is always absorbed before the two-celled stage is reached. The sac begins to enlarge after the four-celled stage, the principal enlargement being from the antipodal end and at right angles to the long axis of the sac. The antipodals persist for a short time, but the synergids disappear early. In the four-celled stage a zone of very thin walled cells surrounds the sac and the absorption of these cells is an important factor in the enlargement of the sac. A long beak is formed from the micropylar end of the ovule. The formation of the embryo is regular and the basal cell of the filamentous suspensor is very large. Both cotyledons develop. The endosperm is peripheral.

Studies in Phycomycete Fertilization: Sclerospora Graminicola (Sacc.): F. L. Stevens, A. & M. College, W. Raleigh, N. C.

The oosphere in *Sclerospora graminicola* is uninucleate, clearly resembling the general type exhibited in the *Peronosporeae* and in *Albugo candida,* but differing from the more primitive forms such as *Albugo bliti* and *A. Tragopogonis.* The antheridium bears several nuclei, but one only enters the antheridial tube. Simultaneous mitosis occurs here as in the related forms, zonation is a prominent phase in oogenesis and the cœnocentrum is a conspicuous organ in the oogonium.

Notes on Agrostis: A. S. Hitchcock, U. S. Dept. of Agriculture, Washington, D. C.

Synonymy of species of the genus *Agrostis* occurring in North American History of several names. Notes on some of the early species described by Triu and others.

The Absorption of Water; A Function of the Ligule and Stipulaceous Tissue of the Grasses: F. L. Stewart, Merrysville, Pa.

An account of observations and experiments proving that, coordinate with certain structural provisions for the conveyance from the leaf-blade of the grasses of dew and rainwater deposited thereon, the ligule and the connected tissues of the leaf-sheath actively absorb it and transmit it into the circulatory system of the plant, thus supplementing the supply of water derived from the root.

The Pith Cells of Phytolacca Decandra: Henry Kraemer, Philadelphia, Pa.

The pith of this plant is differentiated into two parts, a peripheral portion made up of active cells, and a central metamorphosed portion consisting of biconcave diaphragms composed of both active and inactive cells separated at regular intervals by cavities. The latter appear to be formed by the abstraction of water from the cells of this region, as a result of the development of other parts of the stem. This view as to their origin seems to be confirmed by the fact that in the process of drying that portion of the pith in the upper internodes, which is not already metamorphosed, becomes thus differentiated. The metamorphosed pith in *Phytolacca decandra* seems on the one hand to have a certain resemblance in origin to the hollow internodes of the stems of the Polygonaceæ and on the other hand to resemble the heterogeneous or modified pith of the Magnoliaceæ.

A Review and Criticism of the Botanical Curriculum of some of our Colleges and Universities—from the Student's Standpoint: E. Mead Wilcox, Auburn, Ala.

Special Haustorial Apparatus in connection with the Embryo Sac of Angiosperms: JOHN M. COULTER, University of Chicago.

A Note on the Vitality of the Spores of Marsilea: MARSHALL A. HOWE, N. Y. Botanical Garden, Bronx Park, New York City.

The Ascent of the Transpiration Stream: EDWIN BINGHAM COPELAND, Stanford University, California.

Chemical Stimulation and the Evolution of Carbon Dioxide: EDWIN BINGHAM COPELAND, Stanford University, California.

HERMANN VON SCHRENK,
Secretary.

ASSIGNMENTS OF GEOLOGIC AND PALEONTOLOGIC PARTIES.

THE following assignments of geologic and paleontologic parties of the U. S. Geological Survey have been made for the present field season:

Dr. Geo. I. Adams will make an areal and economic survey of the Yellville quadrangle in Arkansas, with special reference to the preparation of a report on the Arkansas lead and zinc district. He will be assisted by Professor A. H. Purdue and Mr. Ernest F. Burchard.

Dr. Geo. F. Becker will continue the supervision of the Division of Physical and Chemical Research and the preparation of a report embodying his investigations on the conditions of gold deposition in the Mother Lode of California.

Mr. J. M. Boutwell and Dr. J. D. Irving will study the mining geology of the Park City district, Utah.

Dr. J. C. Branner will continue areal surveys on the Santa Cruz quadrangle, California.

Mr. M. R. Campbell will continue the supervision of areal and economic work in New York, Pennsylvania, Ohio, Indiana, Kentucky, and West Virginia. He will be assisted by Messrs. Charles Butts, Lester H. Woolsey, Ralph W. Stone and Marcus Goldman in Pennsylvania; by Mr. Myron L. Fuller in New York and Indiana, and by Professors Geo. H. Ashley and L. C. Glenn in Kentucky.

Professor T. C. Chamberlin will continue the supervision of investigations in Pleistocene geology of the United States. He will be assisted by Professor R. D. Salisbury and Mr. W. W. Atwood in the Rocky Mountain region; by Frank Leverett and F. W. Taylor in Michigan, and by W. C. Alden in Wisconsin.

Professor W. B. Clark, with assistants, will continue the investigations of the geology of the Coastal Plain region in Maryland and Delaware, and of the Piedmont plateau of Maryland in cooperation with the Geological Survey of Maryland.

Dr. Whitman Cross will suspend his regular field work in Colorado for the present season and spend a portion of the year in the Hawaiian Islands for the purpose of investigating volcanic phenomena.

Professor T. Nelson Dale will continue his surveys in western Vermont and will survey the Slatington quadrangle in eastern Pennsylvania. He will be assisted by Professor Frederick B. Peck and Mr. Fred H. Moffit.

Dr. William H. Dall will continue his studies for the completion of the revision of the Tertiary faunas of Florida.

Mr. N. H. Darton will continue areal surveys in the Black Hills and the Big Horn Mountains, and will complete a reconnaissance of the Great Plains for the preparation of a map showing the geology and water resources of that region. He will be assisted by Mr. C. A. Fisher.

Mr. J. S. Diller will complete the areal and economic survey of the Redding quad-